



Washington State Department of Transportation



American Public Works Association
Washington State Chapter

Technical Commentary for Standard Plan B-1 Catch Basin Type 1

General Information

Background: Catch basins are primarily used to collect pavement runoff and to act as a junction for a storm drain system. Catch basins differ from manholes in that catch basins are constructed with a sump below the pipe invert. The sump collects sediment and debris entering the catch basin through the grate inlet. The collected material is typically removed by hand or by the use of a vacuum truck. Catch basins differ from grate and drop inlets shown in the B-4 series of the Standard Plans in that the B-4 inlets have much larger grates with more flow capacity. Catch basins differ from the concrete inlet shown in Standard Plan B-26 in that the concrete inlet has no sump to catch sediments that may enter through the grate.

Maximum Pipe Size: The maximum pipe size that can be placed in a Type 1 catch basin is dependent on the maximum knockout size and the outside diameter of the pipe. Type 1 catch basins are provided with a maximum knockout size of 20 inches. It is recommended that a gap of at least 1.5 inches be provided between the knockout wall and the outside of the pipe. The gap facilitates pipe installation into the catch basin. Once the pipe is installed, the gap is filled with concrete grout. Therefore, the maximum pipe outside diameter that should be inserted into the knockout is 17 inches.

The relationship between the inside diameter of the pipe and outside diameter of the pipe varies, depending on the pipe material used. The following table demonstrates the typical outside diameter of various pipe materials accepted by WSDOT for storm sewer applications:

Inside Diameter (in)	Table 1 Typical Outside Diameters of Various Pipe Materials (in.)					
	Concrete ¹	Metal ² 2 ² / ₃ x 1 ¹ / ₂	Metal ² 3 x 1	HDPE ³	Profile Wall PVC ⁴	Solid Wall PVC ⁵
12	17	13	14	15	13.5	12.5
15	21	16	17	18	16.5	16

1. Reinforced or plain

2. The number refers to the corrugation pitch and depth, and are the same for both steel or aluminum.
3. High density polyethylene Stand Spec. 9-05.20
4. Standard Spec. 9-05.12(1)
5. Standard Spec 9-05.12 (2)

Using 17 inches as the maximum O.D. for pipe that can be installed in a Type 1 catch basin, the maximum allowable pipe inside diameter that should be specified is as follows:

Table 2 Maximum Allowable Inside Pipe Diameter for Type 1 Catch Basins					
Concrete	Metal 2 ² / ₃ x 1 ¹ / ₂	Metal 3 x 1	HDPE	Profile Wall PVC	Solid Wall PVC
12 in.	15 in.	15 in.	12 in.	15 in.	15 in.

If the inside diameter of the pipe to be used is larger than that shown in Table 2, a larger catch basin, such as a Type 1A or Type 2, must be specified.

Pipe Alternates: Most contracts allow a number of pipe alternates to be used. A Type 1 catch basin should be chosen for use only if it is large enough to accept all of the specified pipe alternates for that location. For example, if a contract called for 12-inch diameter storm sewer pipe and all of the alternates listed in Table 2 were specified, a Type 1 catch basin would be appropriate. However, if the contract called for 15-inch storm sewer pipe and all of the alternates listed in Table 2 were specified, a Type 1 catch basin would not be appropriate. The next largest catch basin, a Type 1L, should be specified.

Maximum Depth: The maximum depth for this structure, as well as the Type 1L and Type 1P catch basins, is specified as 5 feet. The depth is measured from the pipe invert to the finished roadway grade. Division 7-05.3 requires that all catch basins be watertight. In order to meet this requirement, it is often necessary to access the catch basin to regrout the sides of the catch basin or to remortar the joint between the pipe and the catch basin wall. Exceeding the 5-foot depth significantly increases the difficulty in performing these repairs. It is recommended that a Type 2 catch basin be specified when the maximum depth exceeds 5 feet.

The maximum depth is not a concern regarding routine maintenance such as cleaning because catch basins are cleaned with the use of a vactor truck. The vacuum systems on most vactor trucks can effectively draw material from depths up to 15 feet.

Catch Basin Taper: The catch basin is tapered to facilitate removing the catch basin from the forms after it has been fabricated. Often the catch basin is fabricated upside down, which results in the top being larger than the bottom. All thickness and width dimensions are measured at the top of the base section.

Flow Rate Through the Catch Basin: The flow rate through the catch basin is generally controlled by either the grate inlet or the pipes entering or exiting the catch basin. The

storage capability provided by the catch basin is relatively small and should be ignored in storm sewer calculations.

Frame and Grate: The technical commentary for Standard Plan B-2a discusses installing the frame and grate with the flange down or cast into the adjustment section, as described on note 4 of this Standard Plan.

Applicable Specifications

6-02.3	Construction Requirements for Concrete Structures
7-05	Manholes, Inlets, and Catch Basins
9-05.15(2)	Metal Frame, Grate and Solid Metal Cover for Catch Basins or Inlets
9-07.7	Wire Mesh
9-12.4 and 5	Precast Concrete Manholes and Catch Basins

Referenced Standard Plans

B-2a	Metal Frame and Grate for Catch Basin and Inlet
B-2b	Vaned Grate
B-1z	Miscellaneous Details for Manholes and Catch Basins

Other Information

Standard Item Number: 3091

Catch Basin Maintenance - Chapter 7-1.2 WSDOT *Highway Runoff Manual*

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